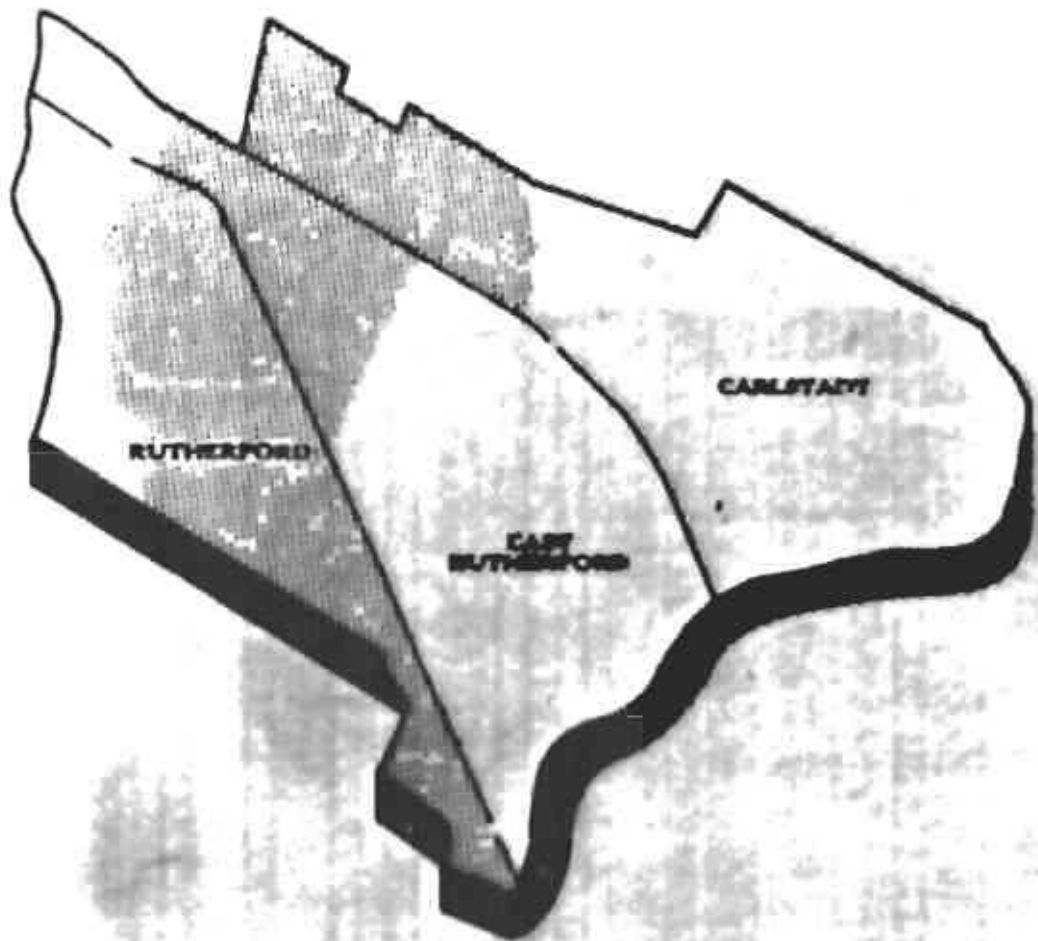


**BERGEN COUNTY SEWER AUTHORITY**  
**JOINT MEETING EXTENSION**

**FACILITY PLAN**



**CLINTON BOGERT ASSOCIATES**  
**CONSULTING ENGINEERS**

**MAY, 1977**

BCSA0076323

**BERGEN COUNTY SEWER AUTHORITY  
JOINT MEETING EXTENSION**

**FACILITY PLAN**

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Counsel**

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**CLINTON BOGERT ASSOCIATES  
CONSULTING ENGINEERS**

**MAY, 1977**

**BCSA0076324**

# CLINTON BOGERT ASSOCIATES

PARTNERS  
IVAN L. BOGERT  
HERBERT L. KAUFMAN

PRINCIPAL ASSOCIATES  
WAYNE EAKINS  
JOHN H. SCARINO

ASSOCIATES  
JOHANNES DEWAAL  
FRANCIS J. DOBROWOLSKI  
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HERBERT LANDESMAN  
UMBERTO A. MILLETARI  
WILLIAM WHEELER



CONSULTING  
ENGINEERS

2125 CENTER AVENUE • FORT LEE, NEW JERSEY 07024  
(201) 944-1676 • CABLE: BOGERTENG FORTLEENJ

May 31, 1977

Bergen County Sewer Authority  
Post Office Box 122  
Little Ferry, New Jersey 07643

Re: Joint Meeting Extension  
Facility Plan

Gentlemen:

In accordance with the terms of our contract dated January 29, 1974 and in compliance with U.S. Environmental Protection Agency Rules and Regulations, we are transmitting herewith a draft copy of the Joint Meeting Extension Facility Plan.

Conclusions and recommendations indicating the need to proceed with the final design and construction of the proposed Pumping Station and force main are on Pages 2-4.

Respectfully submitted,

CLINTON BOGERT ASSOCIATES

By: 

Ivan L. Bogert  
P.E., N.J. Lic. No. 6341

ILB/DHH:az  
Encl.

BCSA0076325

1.0 Summary, Conclusions and Recommendations

1.1 Summary

The Joint Meeting (JM) sewage treatment plant which serves portions of the Boroughs of Rutherford, East Rutherford and Carlstadt has been discharging an unsatisfactory effluent for many years. Based on reports, issued by the JM in 1966 and by the Bergen County Sewer Authority (BCSA) in 1971 and 1973, the State and Federal authorities concurred that the BCSA should construct a pumping station and force main, to transfer the JM flow to the BCSA system. The current National Pollution Discharge Elimination System (NPDES) permit for the JM plant requires the permittee to discontinue operation by connecting to the regional BCSA system.

This Facilities Plan discusses the natural, utility, and demographic systems which may affect, or be affected by, the recommended project. The projection of increasing flows, from the JM service area directly affects the project design. The report includes an Infiltration/Inflow analysis of the 46 miles of sewers tributary to the proposed JM pumping station.

Alternate schemes for treating and transporting sewage generated in the Joint Meeting area were considered. The report identifies the environmental, organizational, economic or legal factors which led to the preferred alternate selection. Preliminary design and layout of the recommended pump station and force main are presented. The project costs, method of financing, and schedule of implementation are also developed.

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#### 4.3 INFILTRATION/INFLOW ANALYSIS

##### 4.3.1 Purpose and Scope

Section 201 of the 1972 Water Pollution Control Act Amendments and Section 35.927 of the Rules and Regulations of the EPA requires an Infiltration/Inflow (I/I) analysis for projects requesting Federal Grant monies. A subsequent staged Sewer System Evaluation Survey (SSES) is required if the analysis demonstrates that the sewers admit excessive Infiltration/Inflow. Excessive Infiltration /Inflow is that portion which a cost-effectiveness analysis determines as more economical to eliminate from the system than to transport and treat.

The analysis presented as Section 4.3 of the Facilities Plan discusses the tributary sewer system, extraneous flows, field investigations, the cost-effectiveness analysis and the recommended programs. Some supportive data which is usually incorporated into an independent I/I analysis is included in Sections 4.1, 4.2 and 5.0.. Other supportive data is included in the I/I analysis for the BCSA system.

##### 4.3.2 Sewer System

4.3.21 Development - Most of the sanitary sewers in the Joint Meeting service area were constructed around 1910 by the Boroughs of Rutherford, East Rutherford and Carlstadt. Between 1910 and 1940, sewage from the three municipal sanitary sewer systems discharged to Berry's Creek after passing through rudimentary municipal sewage treatment plants. The treatment provided by these facilities was

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inadequate to prevent increased pollution of Berry's Creek and the Hackensack River. The pollution was compounded by the tidal action in these waterways which retards the downstream travel of the sewage pollutants.

In 1936 the State Department of Health adopted a resolution requiring secondary treatment for all sewage discharged to the Hackensack River and its tributaries. To comply with this ruling the three Boroughs decided that a single sewage treatment plant would be most feasible. Accordingly in 1938, Rutherford, East Rutherford and Carlstadt created the "Joint Meeting" empowered to construct, operate, maintain and finance a single secondary treatment plant and the trunk sewers necessary to convey sewage from the municipal systems to the plant. The Joint Meeting Treatment Plant in Rutherford and the trunk sewers were constructed as PWA projects (N.J. 1400F Contracts 1 and 2) in 1939 and 1940.

#### 4.3.22 Description

Sewer Lengths - There are presently 46 miles of gravity sewers, excluding house connections, tributary to the Joint Meeting plant. Approximately 43.9 miles were constructed by the municipalities. The remaining 2.1 miles were constructed by the Joint Meeting. This is the sewer length distribution by municipality:

	Municipal Sewers (miles)	Joint Meeting Sewers (miles)	Total (miles)
1. Carlstadt	12.6	0.9	13.5

(Cont'd)

BCSA0076371

Joint Meeting

1. Engineer

Rutherford - Vent and pick holes in the manhole covers admit inflow to the sanitary system in areas which flood during heavy rainfall or high tides. Such flooding was reported on Veteran's Boulevard and on Erie Avenue east of Chestnut Street. Possible storm connections to the sanitary system along Orient Way and at other unspecific locations may also contribute inflow. Other inflow sources include air conditioners, sump pumps and drains for roofs, yards, foundations and cellars, which may be connected to the sanitary system. The interviewed officials were not aware of the exact location of any of these sources.

In the preliminary investigations for night metering our field technicians discovered a cross connection between the storm and sanitary sewers on Erie Avenue at Chestnut Street. This cross connection apparently functions as an inflow source since the Superintendent for the D.P.W. reported that heavy rainfall surcharges the storm sewers in this area. The pressure from the surcharging occasionally lifts storm manhole covers off their rims.

Sewers in areas with a high groundwater table may contribute excessive infiltration. Reported areas with high groundwater include the swampy meadowlands, underlain by springs east of Route 17 and Springdell Avenue.

Root intrusion into the house connections along with buildups of grease and rags have caused basement backups on Orient Way near Winslow place. The root intrusion may indicate excessive infiltration.

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East Rutherford - Flooding during heavy rainfall was reported on Paterson Avenue at Hoboken Avenue and on Hackensack Street at the railroad crossing. As previously mentioned, street flooding contributes inflow to the sanitary system. Specific inflow sources within the borough such as storm system cross connections, sump pumps or illegal drain connections were not reported. High groundwater east of Route 17 and springs throughout the borough indicate areas which may contribute excessive infiltration.

Carlstadt - These areas subject to flooding during extremely high tides or heavy rainfall, may contribute inflow to the Carlstadt system:

1. Broad Street between Thirteenth and Fourteenth Streets
2. Hoboken Road at Tenth and Broad Streets
3. The general area east of Route 17

Illegal drainage connections (roof, area, foundation and cellar drains) were reported on Eighth Street north of Marsan Drive. Drains may connect to the sanitary system in other areas, however, specific locations were not reported.

The area between Route 17 and Berry's Creek lies within the Hackensack Meadowlands. Excessive infiltration caused by high groundwater may occur in this section of the system. Root intrusion into the system, another indicator of excessive infiltration, was reported on Tenth Street near Division Street, and on Sixth Street between Berry Avenue and Broad Street.

4.3.25 Maintenance Program - The three serv<sup>ices</sup> areas  
BCSA0076378



sewers is included in the amount assessed for this miscellaneous category.

2. Reduction of Bypassing - The amount of sewage bypassed during extreme storms will be reduced by the program of extraneous flow removal. The increased water quality due to the reduced bypassing has a substantial environmental benefit. Large tangible benefits from this program would be incurred from reducing the peak should storage or treatment of the extreme peaks be required. Additional savings would be incurred by lessening the extent of the cleanup of sewage floatables and solids deposited on the river banks.

3. Reduced Sewage Flooding - During peak inflow and infiltration periods, sewers without emergency overflows surcharge to levels which can flood streets, basements, and sewer system structures. The disadvantages of such flooding are fairly obvious. Street and yard flooding creates an unhealthy condition during the duration of the flooding and requires a substantial cleanup and disinfection effort after each occurrence. In addition to the disadvantage associated with street flooding, sanitary sewage entering basements can destroy valued possessions of the residents along the route of a surcharged sewer. Within the sewer system, sewage solids are deposited on the bench and rungs of each manhole, junction chamber, and meter chamber along the surcharged section. Unless cleaned after each surcharge these solids create noxious conditions in those structures. Reducing the extraneous peak flow derives economic benefit by reducing the occurrence of such surcharging.

BCSA0076400

River into which the BCSA sewage treatment plant discharges as "Water Quality Limited" TW-2. In accordance with this classification, the current NPDES permit for the BCSA plant during construction, requires a minimum of 75 percent removal of the influent BOD, and suspended solids over a 30 day period. The permit also specifies a maximum effluent BOD and suspended solids level of no more than 75 ppm over a seven day period and no more than 50 ppm over a 30 day period. These limits will be tightened when the expansion is completed.

Because the Hackensack River is designated "Water Quality Limited" the BCSA plant may soon need to provide better than secondary treatment. In Special Grant Conditions established by the EPA for the current plant, expansion commits the Authority to prepare a facility plan detailing alternate methods of obtaining the specified water quality.

The present ocean dumping permit for the plant requires complete digestion of all primary and secondary sludge barged to the Atlantic dumping area. In addition, the permit directs the Authority to prepare a facility plan recommending the most cost-effective method of sludge disposal in anticipation of a ban on ocean dumping.

#### 4.4.2 Joint Meeting Treatment Plant

Since its construction in 1940, the plant has performed inadequately. The inadequate treatment results mainly from operating and maintenance problems. Treatment units which malfunctioned were removed and not repaired. The mechanical equipment has become obsolete. Presently, the

BCSA0076428

filters often clog requiring the flow to be bypassed, improperly pretreated industrial wastes entering the filters has inhibited biological growth on the filter stones. The sludge withdrawal system in the settling tank no longer functions and the tanks must be bypassed and dewatered to remove the sludge. The two-phase sludge digester serves mainly as a holding and dewatering tank.

The sludge incineration facilities are inoperable and thickened sludge is pumped to a nearby lagoon. Operation of the coagulating tank equipment has been discontinued. A few years after construction, the magnetite filters clogged and this unit has been bypassed since that time. Additionally, sections of the plant administration building have developed structural cracks caused by support pile deterioration.

The JM plant now provides less than primary treatment, removing on the average only about 25 percent of the BOD and suspended solids from the influent sewage. Such treatment is not acceptable for discharges to Berry's Creek. Tests in 1972 revealed the waters of Berry's Creek to be anaerobic.

The Joint Meeting is presently under EPA and State orders to discontinue operation of the JM plant and to connect to the BCSEA system. The three municipalities, Carlstadt, East Rutherford and Rutherford, have indicated they will comply with this directive. The Joint Meeting will determine the ultimate disposition of the plant facilities. BCSA0076429

Year	Average Flow (mgd) *	Peak Flow (mgd)
1976	3.04	8.4
1980	3.83	10.0
1990	4.98	12.5
2000	6.13	15.0
2010	7.17	17.0
2020	7.36	17.5

\*Excluding excessive infiltration

5.3.5 Non-Excessive Infiltration and Inflow - From the infiltration inflow analysis it was determined that the average infiltration rate was 1.30 mgd and the average inflow rate was 0.04 mgd. The preliminary cost-effectiveness analysis indicated 0.66 mgd of infiltration may be cost-effectively removed by a rehabilitation program. Cost-effective removal of inflow sources discovered during the physical inspection and smoke testing operations may remove 70 percent of the 0.040 mgd average inflow, or 0.028 mgd. Therefore average non-excessive infiltration may be 0.64 mgd, and non-excessive inflow maybe 0.012 mgd.

5.3.6 Flow Characteristics - Joint Meeting sewage contains a considerable amount of industrial discharge. Periodically, batches of industrial wastes received at the JM plant, have overloaded the plant units and upset the biological action within the trickling filters. The shock load effects from these wastes have reduced JM plant efficiency.

BCSA0076434

5.3.7 Sewage Overflows - The system tributary to the proposed JME is comprised entirely of separate sanitary sewers. There are no combined sewers. However, a storm-sanitary system interconnection was discovered during our preliminary field investigations, indicating the possibility of other such connections. The proposed inflow investigation should effectively detect any other cross-connections.

5.3.8 Possible Flow Reduction

5.3.8.1 Reduction of Industrial Flow - Flow from the service area will eventually be treated at the BCSA plant. Therefore, pretreatment requirements of the Authority will apply to the Joint Meeting industries. Industrial discharges may be sampled on a regular basis at the point of entry. If the wastes entering the system fail to meet discharge standards then pretreatment will be required. Discharge of uncontaminated cooling water to the system is also prohibited.

Carlstadt, East Rutherford and Rutherford intend to implement an industrial waste regulation and an equitable cost recovery regulation which will meet EPA requirements. This program will be developed and coordinated in conjunction with the BCSA program.

As discussed in section 4.2.42, most of the industries in the service area discharge small quantities of waste. BCSA0076435.

instructing the JM to join the the BCSA would have to be reversed. Such implementation difficulties would certainly delay the abandonment of the JM plant.

An evaluation of environmental issues also weighs against the PVSC transfer. Primary adverse impacts caused by construction of the needed connecting sewers, although temporary would be greater because the construction would occur through a more densely developed area. Adding the JM flow to the PVSC trunk would raise the hydraulic profile in that sewer. Since the trunk intercepts combined sewer systems the quantity of combined sewage bypassed to the Passaic River would increase because of the lost trunk capacity used to convey JM flow. The interbasin transfer of JM flow would cause another adverse impact. Effluent from the BCSA Plant discharges to the tidal Hackensack River twelve miles above the outlet. The effluent of the PVSC Plant discharges to Upper New York Bay. Removal of the JM effluent would decrease the flow in the lower Hackensack River. This would result in slightly longer detention time of pollutants, more saltwater intrusion and slightly lower average river water levels available to recharge aquifers.

### 6.3 Upgrading the JM Plant

6.3.1 Background - The 1966 JM Preliminary Report on Sewerage Facilities considered five alternate schemes for sewerage the JM area and the eastern portion of BCSA0076444 and East Rutherford. The schemes included combinations of

treating portions of this flow (1) at the BCSA plant (2) at an upgraded JM Plant (3) at a new plant on the Hackensack River. During the late 1960's and early 1970's the eastern portions of Carlstadt and East Rutherford were sewerred with the discharges pumped to the BCSA Hasbrouck Heights Trunk Sewer. Thus, several alternates presented in the 1966 report including the Hackensack River Plant, are no longer valid.

However the analysis of the two basic alternates for serving the JM area, (1) at the BCSA Plant (2) at an upgraded JM Plant, remains valid. The report recommended, the Joint Meeting should not upgrade the JM Plant unless large federal grants were available for the purpose of upgrading. Otherwise the JM area should be sewerred to the BCSA plant. This conclusion was based mainly on economic considerations. The report demonstrated that upgrading would be the more expensive alternative. Based on this and subsequent analyses, the court ordered the JM to connect to the BCSA system.

These issues were evaluated in recommending the alternative of transfer to the BCSA over upgrading the existing plant:

1. Berry's Creek-Hackensack River water quality
  2. Reliability
  3. Sludge Disposal
  4. Construction Impacts
  5. Construction Costs
  6. Operating and Maintenance Cost
  7. Implementation
- BCSA0076445

6.3.2 Berry's Creek - Hackensack River Water Quality - As mentioned in Section 4.1.4 the water quality in Berry's Creek is presently so poor that at times of the year the stream is anaerobic. The stream's poor quality is mainly due to the poor operation of the JM plant. Upgrading the JM plant would reduce the unsatisfactorily high BOD and SS load discharged to Berry's Creek, and raise the dissolved oxygen level. However the effluent from an upgraded JM plant would result in higher concentration of BOD, SS, phosphorous organic nitrogen and heavy metals, (and lower dissolved oxygen) in Berry's Creek than would result if the effluent were eliminated. When the JM effluent is removed, the only treated sewage discharged to Berry's Creek will be from the 0.7 mgd Wood-Ridge municipal plant.

The benefit of upgraded Berry's Creek quality will be somewhat balanced by the slight lowering of the Hackensack River quality between the BCSA plant outfall and Berry's Creek. The lowering of the Hackensack River quality will be much less than the increase of Berry's Creek quality because of the much larger base flow in the Hackensack River and the better quality effluent produced by the BCSA plant.

The beneficial effect of higher Berry's Creek quality will be somewhat offset by the disadvantage of lower flows. Average Berry's Creek flow would be reduced about 30 percent. This lower flow will result in longer pollutant resident time, slightly increased salt water intrusion and

BCSA0076446



slightly lower creek levels available to recharge aquifers. These disadvantages will be somewhat offset by the beneficial effect of higher flow rates in the section of the Hackensack River between the BCSA Plant and Berry's Creek.

6.3.3 Reliability - Many JM industries discharge process wastes. In the past these wastes have caused plant operating difficulties. The smaller the treatment plant the more vulnerable the biological processes are to upset by industrial shock load. The BCSA plant currently treats large quantities of industrial wastes, and the plant processes were designed to accommodate these wastes. Therefore the reliability of treatment would be greater at the larger BCSA plant than at a smaller upgraded JM plant. To achieve the same degree of reliability at the JM plant a more stringent monitoring of industrial discharge would be necessary.

6.3.4 Sludge Disposal - The JM plant was constructed with digestion, vacuum filtration, and incineration units for sludge disposal. Currently the raw sludge is lagooned because all sludge disposal facilities are in disrepair. If the JM plant were upgraded, the sludge disposal facilities would have to be repaired and upgraded, or another means of disposal implemented. Regional sludge disposal at the BCSA plant appears to be a more economically and environmentally sound alternative. The quantity of sludge originating from the Joint Meeting sewage is small in comparison to the amounts currently processed at the BCSA plant.

As discussed in Section 6.3.2, JM plant abandonment will have several beneficial impacts on water quality. BOD, organic nitrogen, phosphorus, COD and heavy metal loadings in Berry's Creek will be reduced when the treatment plant discharge is eliminated. This will improve water quality in Berry's Creek. Termination of sludge lagooning at the plant site will prevent further pollution of groundwater supplies. Leachate from the lagoons will be reduced after the lagoons have stabilized.

The adverse impact on the Hackensack River caused by additional discharges from the BCSA plant is minor since the additional flow from Joint Meeting is small in comparison with the flow presently treated at the BCSA plant. Discharging the JM flows to the Hackensack River is beneficial in that it will increase flow and reaeration rates, aid in dispersion of pollutants, prevent salt water intrusion, and recharge groundwater supplies downstream.

Alleviation of Public Health Problems - The selected plan will reduce public health problems by replacing a source of river and soil pollution by conveying the sewage from the JM area to an environmentally sound regional treatment plant.

Industrial and Residential Relocation - The selected plan will not cause relocation of any industries, residences or roadways. It may allow the development of the site of the abandoned JM plant. BCSA0076466

#### 10.0 Summary of Environmental Considerations

The proposed pumping station and force main which will convey Joint Meeting flows to the BCSA system for treatment represents the most environmentally sound alternative. Construction of the proposed facility will eliminate most of the pollutant loading to Berry's Creek and consequently improve the water quality. Present sludge lagooning procedures will cease and impacts to the local ecosystem will decrease. As the sludge stabilizes in these lagoons the public health hazard will diminish. By constructing the pumping station on the existing plant site and the force main along existing roadways and rights of way the adverse primary impacts will be minimized and temporary. The Joint Meeting Extension does not disturb any historically, archaeologically or environmentally significant areas. Since the area is zoned for light industry and sports complex by the HMDC, the overall environmental sensitivity is limited.

In the design of the East Rutherford Extension force main, the BCSA provided for future expansion of the system by providing sufficient capacity to convey the Joint Meeting flow. A JME connection point was included on Gotham Parkway in the construction of the BCSA ERE force main. There will be limited other impacts on the existing BCSA system.

The proposed project has certain adverse primary impacts which are temporary in nature. ConstBCSA0076498 Berry's Creek Crossing will disturb the waterway and local